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BIRTH ORDER, SEX, AND THE ROD-AND-FRAME TEST

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## Table of Contents

	Page
List of Tables . . . . .	1
Abstract . . . . .	2
Introduction . . . . .	3
Method . . . . .	9
<u>Subjects</u> . . . . .	9
<u>Instruments</u> . . . . .	9
<u>Procedure</u> . . . . .	9
Results . . . . .	10
Discussion . . . . .	13
References . . . . .	16



## List of Tables

Table	Page
1 Summary Table for the Analysis of Variance . . . . .	11
2 Mean Scores on the Rod-and-Frame Test . . . . .	12

### Abstract

Various studies of the relationship of dependency to birth order have yielded inconsistent results. In this study the concept of dependency focused upon was field dependency as measured by the rod-and-frame test (RFT). Data on sex, birth order, and RFT scores were collected for 637 psychiatric inpatients. An analysis of variance revealed that (a) males were less dependent than females ( $p < .001$ ), and (b) first-borns were less dependent than later-borns or only-children ( $p < .025$ ). Theoretical implications were discussed.

The history of the birth order concept dates back to 1874 when Francis Galton, an anthropologist, found that eminent scientists and other well-known creative individuals were much more frequently first-borns than middle- or last-borns. Since then interest in ordinal position has fluctuated within psychological circles.

The publication of Schachter's The Psychology of Affiliation in 1959, generated a proliferation of studies centering upon the birth order variable. Schachter developed a theoretical explanation for birth order differences based upon his anxiety-affiliation experiments. He found that in anxiety-arousing situations, early-borns more often manifested affiliative and dependent behaviors than did later-borns. When presented with the choice, anxious early-born female subjects chose to be together with other subjects (as opposed to waiting alone), whereas equally anxious later-born female subjects did not do so. Schachter concluded that independent measures of dependence were systematically correlated with ordinal position: First-born individuals were consistently more dependent than later-born individuals.

Influencibility, which is assumed to be in part a function of dependence, has been demonstrated to relate to ordinal position. A study by Ehrlich (1958) indicated that first-born and only- subjects tended to conform more often than later-born subjects. Schachter (1959) argued that this

differential dependency stems from the "overparenting" of first-borns by their inexperienced and insecure mothers.

While Schachter worked only with female subjects, he generalized his findings to include both sexes. Although many findings on birth order have corroborated Schachter's hypothesis that first-born children learn more dependency than later-borns (Sears, 1950; Haeberle, 1958; Wrightsman, 1960), other research has yielded results which fail to support his general thesis. Pertaining to anxiety and affiliative behavior, differences found between first-born females and later-born females were either not substantiated or reversed for males (cited in McDonald, 1969: Gerard & Rabbie, 1961; McDonald, 1968; Zimbardo & Formica, 1963; Zucker, Manosevitz, & Lanyon, 1968). Warren (1966) found that, under conditions of fear, female but not male first-borns sought the company of others more than later-borns (Haeberle, cited in Schachter, 1959; Murdoch, 1966; Sampson, 1962). It consequently seemed imperative to consider the sex of the subject along with ordinal position.

Eisenman is especially vehement on this point, and for just reason. In his research on complexity-simplicity preferences (Eisenman, 1970; Taylor & Eisenman, 1968), Eisenman found both birth order and sex differences. First-born males and later-born females preferred more complexity than other males or females, respectively. Eisenman also found that females preferred more complexity than males, with the relationship stronger for sex differences than for ordinal



position (Eisenman, 1967). To quote from Eisenman (1970), "the analysis of sex or birth order singly, rather than in combination, would give one the erroneous impression that neither variable had any effect [p. 147]." He also emphasized the importance of considering only-child subjects separately from first-born children (Eisenman & Taylor, 1966).

In summary, the research linking birth order, sex, and dependency presents confusing and inconsistent trends. Perhaps a new approach to the measurement of dependency would be helpful. In the present study, a test of spatial-perceptual ability was used to measure dependency.

Witkin and his colleagues conducted a series of studies on the role of visual framework in the vertical and horizontal perception (Asch & Witkin, 1948a, 1948b; Witkin & Asch, 1948a, 1948b). Accumulated evidence supports the notion that the rod-and-frame test (RFT), used to study the perception of the upright, relates to selected aspects of personality (Witkin, Lewis, Hertzman, Machover, Meissner, & Wapner, 1954; Witkin, Dyk, Paterson, Goodenough, & Karp, 1962).

A description of the original RFT was given by Witkin, et al. (1954):

This test evaluates the individual's perception of the position, in relation to the upright, of an item within a limited visual field. The subject is placed in a completely darkened room, facing a luminous frame which surrounds a

movable luminous rod. With the frame tilted, the subject is required to bring the rod to a position that he perceives as upright. For successful performance of this task the subject must "extract" the rod from the tilted frame through reference to body position. The subject is tested on some trials while sitting erect, so that it is relatively easy to refer to the body in establishing rod position, and on other trials while tilted, so that it is more difficult to use the body. On all trials a large tilt of the rod when it is reported to be straight indicates adherence to the visual field; a small tilt indicates independence of the field and reliance on the body [p. 25].

Recent studies have tended to employ only the Series 3 body-erect position (Neville, Workman, & Johnson, 1969; Silverman, 1968; Sugerman & Cancro, 1968). According to Lester (1968), this tendency may have been due to fear of contamination of results by the A and E effects (changes in apparent vertical contingent upon tilting of the head), or it may have simply arisen from the infrequency of tilting chairs.

Witkin and his associates introduced the concept of field dependence, with the subject who showed large error in adjusting the rod to the true vertical being defined as field dependent. Conversely, the subject who showed small error was defined as field independent. Their investigations showed that people differed from one another in relative extent of dependence on the visual field or in relative

ability to use bodily experiences in overcoming the influence of the field. More important, the evidence suggested that each person tended to exhibit a characteristic way of perceiving which was not readily subject to change (Adevai & McGough, 1968), and which was associated with other more general aspects of his personality.

Witkin (1959) has remarked,

... various studies have shown that field independent people are in general less dependent on others. They have greater ability to hold themselves apart from the pressures of their social environment, sometimes even to the point of isolation from other people. Ability to orient one's body independently of the surrounding visual field, or to keep any object separate from its background, thus seems directly associated with capacity to function with relative autonomy of the social milieu in everyday life [p. 5].

This is probably due, in part, to the Witkin, et al. (1954) finding that extent of activity in dealing with one's environment was the characteristic that most effectively discriminated among people with different modes of perception.

The attitudes and behavior involved represented two more-or-less opposite trends: one, passivity, was associated with field dependent perceptual performance; the other, activity, was associated with independent or analytical perceptual performance. Passivity signified inability to function independently of environmental support, an absence of initiating activity, and a readiness to submit to forces of authority. Activity, on the other hand, involved ability to function with relatively little support from the environment.



Further RFT studies have pointed out differences between normal and psychiatric populations. Witkin, et al. (1954) found that in the general population perceptual performances reflecting the extent of field dependence or field independence are ranged in a continuum rather than constituting two distinct types. However, in a hospital population male psychiatric patients tended to appear at the extremes of the continuum and female psychiatric patients were highly concentrated in the field dependent category. Witkin (1965) therefore concludes that pathology occurs more frequently at the extremes than in the middle of the range. Since a psychiatric population tended to heighten the measures of both dependent and independent behavior, this setting appeared to be ideal to observe the relationship of that behavior to ordinal position and sex.

To the investigator's knowledge, there has been only one study in the literature which dealt with the relationship of the RFT and birth order. Culver & Dunham (1969) administered the RFT, along with three other tests of spatial-perceptual ability, to approximately 150 freshman collegiate student nurses. No significant differences were found among the ordinal position groups on any of the tests. Culver & Dunham's negative findings were admittedly limited in scope due to the homogeneity and singularity of sex within the sample.

The purpose of the present study was to investigate the significance of sex and birth order as related to RFT field dependence.



## Method

### Subjects

This study used data drawn from 637 psychiatric inpatients, 248 males and 389 females, at Highland Hospital, a private psychiatric hospital in Asheville, North Carolina, which is a division of Duke University Medical Center. Subjects included virtually all patients admitted to Highland Hospital from August, 1967, to January, 1972, who remained institutionalized for at least one week.

### Instruments

All measures were taken within one week after each subject's admission. The Experimenter-controlled Series 3 of the RFT and information on sex was administered and obtained by the secretaries in the Psychology Department of Highland Hospital. Information about ordinal position in the family was provided through verbal reports made by each subject.

### Procedure

Scores on the RFT, given in total degrees of error, were grouped into six categories according to the subjects' sex and birth order: (a) male first-borns, (b) male later-borns, (c) male only-children, (d) female first-borns, (e) female later-borns, and (f) female only-children. A 2x3 analysis of variance, least squares method (Winer, 1962), was applied to determine possible main and interaction effects.

## Results

An examination of the summary table for the analysis of variance showed significant main effects over both sex and birth order ( $p < .001$  and  $p < .025$ , respectively; see Table 1). However, there was no evidence of significant interaction effect between them.

An examination of the means of the six categories showed that males' RFT scores were lower than females' scores, thus showing males to be less field dependent than females (see Table 2). It can also be seen that the first-borns' scores were lower than the later- or only-borns' scores, indicating that first-borns are less field dependent than the other two birth order groups.

Table 1

## Summary Table for the Analysis of Variance

Source	<u>df</u>	<u>MS</u>	<u>F</u>
Sex (A)	1	220,688.21	40.32**
Birth Order (B)	2	21,318.82	3.90*
A x B	2	184.63	0.03
Error	631	5472.99	

\*p < .025

\*\*p < .001

Table 2

## Mean Scores on the Rod-and-Frame Test

Sex	Birth Order			
	First-borns	Later-borns	Only-children	Total
Males	61.11	76.85	76.24	71.52
Females	97.05	116.18	115.27	110.32
Total	82.14	101.06	101.90	95.21

Note—Scores are given in total degrees of error.

## Discussion

The finding that males were less field dependent than females ( $p < .001$ ) was not unexpected. RFT research has pointed out this sex difference many times before. The most interesting finding, however, was that first-borns of both sexes were found to be less field dependent than later-borns or only-children ( $p < .025$ ). How can these results be accounted for?

The relationship of birth order, a demographic variable, to a score on the RFT, a cognitive variable, is most easily inferred from the emotional correlates which are common to both.

Studies by Gordon (1953) and Crutchfield, Woodworth, & Albrecht (1958) have shown that field dependent persons tend both to view themselves, and to be viewed by others, as socially dependent. Measures reflecting dependent attitudes were found by Pemberton (1952), in an analytic study, to be related to perceptual performance. Witkin, et al. (1962) says that:

... individuals with an analytical field approach, in contrast to people with a global approach, tend to be less dependent on the examiner in test situations for definition both of the task and their role in it; they are regarded by others as socially more independent; they show less interest in and need for people and a relatively intellectual and impersonal approach to problems; they are usually less influenced by authority, tending to be guided by values, standards,



needs of their own; they are apt to have a stable self-view; and they are less attentive to subtle social cues given by others [p. 156].

Many studies have reported associations between dependent behavior in the child and parental attitudes. They suggest that overprotectiveness, overattentiveness, and lack of assurance in the mother interferes with the development of both a sense of separate identity and articulated experiences for the child (Witkin, et al., 1962). This sounds very much like Schachter's (1959) argument that a first-born child's dependency is a consequence of his parents' overprotection and inconsistency as a result of their inexperience and insecurity.

Thus, birth order and the RFT do have a common emotional correlate--dependency. The case has been made that field dependency is closely related to social and emotional dependency, if they are not in fact the same thing.

From the birth order point of view, the finding that males were less dependent than females was, likewise, not unexpected. Schachter (1959) and others have concluded that in general the dependency of girls is higher than that of boys. However, when one considers the significantly independent behavior demonstrated by first-borns of both sexes, it can be seen that yet another dissenter has been added to the parade of conflicting birth order results. In no other studies have both first-born males and first-born females been found to be less dependent than later-borns or only-children using the same measure.

In searching for an explanation, the investigator again was reminded of Schachter (1959):

Whatever variables ultimately prove to be mediated by birth rank, it is obvious that their effects must be a result of differences in child-rearing practices as related to ordinal position and of the different consequences of having older or younger siblings around [p. 79].

From observation, it was noticed that first-borns are probably placed in the role of surrogate parents more often than later-borns or only-children. That is, they are given the responsibility to supervise, enforce rules, and act as a behavior model for their younger siblings, especially in the parents' absence. This role obviously requires quite a bit of autonomy and independent behavior. Though only a conjecture, it is felt that first-borns' role of in loco parentis may be the basis of demonstrated independent behavior. Of course, further research is indicated to explore this notion; also, a replication of the present study using nonhospitalized "normal" subjects would be of value.

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